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BULLETIN
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A Study of the Genus *Psoralea* in America.

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The genus *Psoralea* was first established by Linnæus in the second edition of the Gen. Plant., 358 (1742) and credited to Royen.

In the first edition of the Sp. Plant., 762 (1753), eight species are described, only one of which is credited to America, and is probably an introduced plant from the Island of Madeira.*

DeCandolle in Prodr. 2: 218 credits fifteen species to the United States, Canada and Mexico, some of which, however, have been reduced.

Bentham and Hooker in Gen. Plant. 1: 491, give thirty species to North America and six to South America.

In his Rev. Gen. Pl., p. 193, O. Kuntze transfers all the species of *Psoralea* to the Genus *Lotodes*, Siegesbeck, Fl. Petrop. 66 (1736).

An attempt has been made in this study to base the classification as much as possible on the fruit characters, which are very marked. The genus is accepted as described by Bentham and Hooker.

§ 1. LEAVES PALMATELY 3-5-FOLIOLATE (RARELY 7-FOLIOLATE).

Herbs, erect or assurgent, branching (except *P. cyphocalyx*).

Flowers small (5-8 mm.).

Pods globose.

Leaflets linear-oblong, pods glabrous.

1. *P. lanceolata*.

Leaflets filiform-linear except the basal ones, pods glabrous.

2. *P. micrantha*.

Leaflets obovate, cuneate-obovate or lanceolate-oblong, pods villous.

3. *P. Purshii*.

* *Psoralea Americana*.

- Pods lunate, transversely wrinkled and roughened;
 leaflets filiform-linear. 4. *P. Lupinellus*.
- Pods ovate-oblong, wrinkled; leaflets and spikes sessile or nearly so.
 5. *P. bracteata*.
- Pods ovoid or ovate.
 Pods with an abrupt short beak.
 Leaflets small, flowers few, loosely scattered on slender elongated racemes. 6. *P. tenuiflora*.
 Leaflets oblong-obovate, flowers several together in interrupted spikes or racemes. 7. *P. obtusiloba*
 Leaflets oblong, flowers many in crowded elongated spikes or racemes. 8. *P. floribunda*.
- Pods with a slender elongated beak.
 Leaflets linear, flowers slender-pedicelled in loose elongated racemes. 9. *P. linearifolia*.
 Leaflets linear-lanceolate, plant silvery canescent; calyx inflated in fruit. 10. *P. digitata*.
 Leaflets oblong, plant silvery or woolly-canescens throughout; calyx not inflated in fruit. 11. *P. argophylla*.
- Flowers large (1-2 cm.).
 Calyx gibbous on the upper side.
 Bracts broadly ovate (or in *P. canescens* often lanceolate-ovate).
 Bracts as long as the calyx and enclosing it. 12. *P. Reverchoni*.
 Bracts barely longer than the pedicel; leaflets lanceolate-linear. 13. *P. cyphocalyx*.
 Bracts as long as or somewhat shorter than the pedicel; leaflets obovate, sparingly canescent or glabrous. 14. *P. canescens*.
 Bracts lanceolate-ovate, attenuate, as long as the calyx lobes; leaflets oblong. 15. *P. cuspidata*.
- Plants low, spreading, acaulescent or apparently so.
 Flowers small (5 mm.).
 Leaflets small, pod globose, with a long attenuate beak. 16. *P. pentaphylla*.
- Flowers large (1-2 cm.) and roots fusiform tuberous.
 Hirsute with weak spreading or appressed white hairs.
 Leaflets oblong-cuneate. 17. *P. esculenta*.
 Leaflets linear-oblong. 18. *P. hypogaea*.
 Stems hirsute; leaflets glabrous, except the ciliate margins. 19. *P. subacaulis*.
- Hirsute with more or less rigid, appressed or spreading pubescence.
 Bracts large, scarious, deciduous, as long as the calyx. 20. *P. Californica*.
 Bracts much smaller than the calyx, the lower lobe of which is broadly ovate or spatulate. 21. *P. castorea*.

1. PSORALEA LANCEOLATA Pursh.

Psoralea lanceolata Pursh, Fl. Am. Sept. 475 (1814). Type in Herb. Acad. Phila.

Psoralea elliptica Pursh, Fl. Am. Sept. 741 (1814). Type in Herb. Acad. Phila.

Psoralea arenaria Nutt. Gen. 2: 103 (1818).

Psoralea laxiflora Nutt.; Torr. and Gray, Fl. N. Am. 1: 299 (1838).

Psoralea scabra Nutt.; Torr. and Gray, Fl. N. Am. 1: 300 (1838).

Erect or assurgent, 15–40 cm. or more high, aromatic glandular throughout; stems glabrous or with a minute pubescence and often a few scattered scarious scales at the base; stipules 3–12 mm. long, linear-lanceolate or setaceous; petioles 1–2 cm. long; leaves 3-foliolate; leaflets $1\frac{1}{2}$ –4 cm. long, linear-lanceolate or the basal ones obovate, acute or obtuse, mucronate, glabrous or with a few hairs; peduncles longer than the leaves, ($2\frac{1}{2}$ –5 cm.); inflorescence capitate, small; bracts minute; flowers nearly white; calyx minutely hairy; lobes nearly equal, obtuse; pod globose, 5 mm. long, light with conspicuous large raised brown glands, nearly glabrous; beak small and erect; seed globose, brown.

In O. Kuntze Rev. Gen. Pl. 193, *P. ellipticum* under *Lotodes* is claimed to be on p. 471, of Pursh, Fl. Am. Sept., and therefore preceding the description of *P. lanceolata*, whereas in reality the description of Bradbury's plant under that name occurs in the supplement on p. 741.

Saskatchewan—Macoun, No. 110 (1879).

North West Terr.—Nicollet; River that Turns, Macoun (1879).

Montana—L. F. Ward (1883); Coues; Yellowstone Park, Chas.

H. Hall (1888); above Glendive, L. F. Ward.

Idaho—Camass Creek, W. H. Forwood, No. 41 (1880).

Oregon—Kellogg and Harford, No. 167 (1868–9); E. Hall, No. 105 (1871); Lyall (1860); Geyer, No. 653.

Dakota—Stevens. Pac. R. R. Exp.

Nebraska—Valentine, J. M. Bates, No. 10; Keith Co., G. D. Swezey; Fort Kearney, Fendler (1849); Fort Pierre, Hayden (1853–4).

Iowa—Sioux City, A. S. Hitchcock (1888).

Kansas—Manhattan, Kellerman (1890).

Missouri—Lewis and Clarke (type of *P. lanceolata*); "Upper Louisiana" from Herb. Bradbury, in Herb. Camb. (type of *P. ellipticum*); Nicollet (1839); Buckley (1853).

Colorado—Palmer; Colorado Springs, M. E. Jones, No. 142 (1878); Wolf and Rothrock, No. 181 (1873); Fritchey, No. 8 (1886).

Arizona—Plains near Chirricalma, Lemmon (1881).

2. PSORALEA MICRANTHA A. Gray.

Psoralea micrantha A. Gray; Torr. Pac. R. R. Rep. 4: 77 (1856). Type in Herb. Columbia College.

Assurgent, 3 dm. or more high, from a horizontal root or long slender rootstock of often 1 m. or more in length; stems glabrous, with scattered brown glands, and often broadly-lanceolate or ovate scales at the base; stipules setaceous, varying in length; leaves 3-foliolate, crowded; leaflets linear or filiform-linear, 1–5 cm. long, the basal ones oblong or cuneate-oblong; peduncles about the length of the leaves; flowers white or bluish in small heads or loosely scattered in short spikes; bracts minute; calyx somewhat hirsute, glandular, the lobes about equal; pod globose, over 5 mm. long, glabrous, light brownish with raised darker glands and a straight, slender beak; seed 5 mm. long, globose, somewhat flattened when dry, brown, smooth and shining.

Nebraska—Chimney Rock, H. Engelmann (1858); Fort Kearney, H. Engelmann (1858); Banner Co., Rydberg (1890); Kearney Co., Rydberg, No. 53 (1891).

Kansas—Manhattan, Kellerman.

Indian Terr.—Last Camp on the Canadian, Bigelow (1853), type.

Oklahoma Terr.—Guthrie, Carleton, No. 151 (1891).

Arizona—Rusby (1883); Plains East of the San Francisco Mts., Lemmon (1884); East of Mt. Agassiz, Lemmon.

3. PSORALEA PURSHII, n. sp.

Lotodes ellipticum latifolium Kuntze, Rev. Gen. Pl. i. 193 (1891), not *P. latifolia* Torr. Type Empire City, M. E. Jones, No. 3825 (1882).

Assurgent, glandular throughout, 1–6 dm. or more high from a long slender rootstock, stems glabrous or often somewhat hirsute at the base, scales ovate, scarious; stipules 5 cm. or more long, lanceolate; leaves 3-foliolate, 1½–4 cm. long, obovate, cuneate or elliptical, or the uppermost nearly lanceolate and often much narrower, varying greatly in size and shape, retuse or mu-

cronulate, glandular, glabrous or with a few scattered white hairs; peduncles varying in length, rarely longer than the leaves; flowers scattered in slender spikes or crowded in nearly capitate heads; bracts minute; calyx-lobes about equal, sparingly hirsute; pod globose, over 5 mm. long, with a short erect beak, light with scattered brown glands, and more or less densely villous with silky white hairs; seed globose, 5 mm. long, light brown.

Washington—On a sand hill near the Columbia River, Suksdorf, No. 963 (1890); near Columbus, Suksdorf, No. 851 (1886).

Nevada—Grass Valley, Watson, No. 250 (1868); Empire City, M. E. Jones, No. 3825.

Idaho—Nez Percé Co., Sandberg.

The specimens here cited have passed as *P. lanceolata* as well as several that are put under *P. micrantha*. The type of *P. lanceolata* is an intermediate form from the plains of Missouri, and there is no fruit description. The broad leaved form, *P. Purshii*, has a conspicuously villous pod, and it will be interesting to note whether that character remains constant in future collections. The extremes are so marked that it is deemed advisable to keep them separate, though it will be difficult to distinguish them without the fruit.

4. PSORALEA LUPINELLUS Michx.

Psoralea Lupinellus Michx. Flor. Bor. Am. 2: 58 (1803). Type in Herb. Michx., fide Torrey and Gray.

Psoralea Floridana Shuttleworth in Distrib. Pl. Rugel (1843), name only.

Erect, 3–6 dm. high, slender, branching, glabrous, somewhat glandular; stipules 2–5 mm. long, setaceous; petioles mostly shorter than the leaflets; leaves 5–7-foliolate; leaflets 5–8 cm. long, filiform-linear, with a few scattered glands, the lower ones rarely narrowly oblong-cuneate; peduncles longer than the leaves; racemes slender; flowers few, scattered; bracts minute, ovate, cuspidate; calyx sparingly pubescent, the lobes short, nearly equal; pod 1 cm. long, glandular, somewhat lunate, obliquely twisted, transversely wrinkled, with a short curved beak; seed ovoid, brown.

North Carolina—"Fields of Carolina," Pursh; Cumberland Co., Curtiss (1845).

Georgia—Baldwin; Boykin; Dr. Grant; Niesler; Lewis Leconte; Savannah, Mrs. Say.

Florida—Nuttall; Buckley; between Tallahassee and St. Mark's, Rugel (1843); South Florida, Rugel, No. 163 (1845); Chapman, No. 44 in Herb. Torrey; Tampa, Garber, No. 34; Curtiss (1875); near Jacksonville, Curtiss, N. Am. Pl., No. 558; East Florida, Mary Reynolds.

5. PSORALEA BRACTEATA L.

Psoralea bracteata L. Mant. 264 (1771), fide M. K. Curran, Bull. Calif. Acad. 1: 135 (1885).

Psoralea fruticosa Kellogg, Proc. Calif. Acad. Sci. 7: 91 (1876).

A low spreading sub-shrub, more or less canescent-pubescent throughout; stipules nearly 1 cm. long, lanceolate-subulate; leaves 3-foliolate, sessile or very short-pedicelled (becoming elongated when old), crowded; leaflets 1-2½ cm. long, oblong-obovate, cuneate, mucronate with a recurved rigid spine, very glandular; spikes sessile at the ends of the branches, the lower flowers in the axils of the leaves; bracts lanceolate or ovate, acuminate, nearly as long as the flowers; calyx-lobes ovate, acute, glandular, the lower lobe the longest; "pod glabrous, ovate-oblong, acute, wrinkled and roughened."

California—Streams of Mt. Tamalpais, F. P. McLein (1873). Apparently not since collected. I have not seen mature fruit of this species.

6. PSORALEA TENUIFLORA Pursh.

Psoralea tenuiflora Pursh, Fl. Am. Sept. 475 (1814). Type in Herb. Acad. Phila.

Erect, 2-6 dm. or more high, often from a long subterranean root, stems branching, glabrous or minutely canescent, especially above, glands black, scattered; petioles mostly shorter than the leaflets; leaves 3-foliolate, the basal ones rarely 4-5 foliolate; stipules minute, setaceous; leaflets 5 mm.-4 cm. long, 3-8 mm. wide, oblong elliptical, obtuse or mucronulate, glandular on both surfaces, glabrous above, sparingly canescent beneath; peduncles 2-8 cm. long; bracts minute, ovate, acuminate; flowers 1-3 together, scattered on slender racemes, calyx very small, with a few hairs, closely covered with dark reddish or brown glands, the lobes acute; pod 8 mm. long, ovoid, glabrous, covered with reddish or brown glands; beak short, stout, somewhat recurved; seed 5 mm. long, ovoid, brown.

Differing from *P. floribunda* in its more slender habit, smaller leaves, smaller, fewer and more scattered flowers and generally

more glabrous and glandular appearance. Possibly the two species may run together, though in the bulk of the material in the herbaria examined they can be easily separated. Mr. P. A. Rydberg, who has studied the species in the field, considers them undoubtedly distinct, and it seems advisable to keep them apart.

Montana—Fort Custer, Mearns, No. 244 (1889).

Wyoming—North Fork of the Platte, Frémont (1842); Turkey Creek, Frémont (1845).

Illinois—Beardstown, Geyer (1842).

Missouri—Big Bend of the Missouri, Lewis and Clarke (Sept. 21, 1804, type); Herb. Chapman.

Arkansas?—Vernijo, Abert (1840).

Nebraska—Fort Kearney, Engelmann (1856); Drexel Co., P. A. Rydberg (1890); near Sidney, P. A. Rydberg, No. 47 (1891).

Kansas—Sherman Co., Smyth, No. 345 (1892).

Colorado—G. W. Hulse; Golden, Britton (1882); Boulder, E. Penard, No. 176 (1891).

7. *PSORALEA OBTUSILOBA* Torr. and Gray.

Psoralea obtusiloba Torr. and Gray, Fl. N. Am. 1: 300 (1838). Type in Herb. Columbia College.

Psoralea tenuiflora var. *obtusiloba* S. Wats. Bibliogr. Ind. 255 (1878).

Erect, 30–60 cm. high, branches spreading, stems more or less canescent with fine, appressed, silky, white hairs; stipules very small, setaceous; petioles much shorter than the leaflets, the upper ones often nearly sessile; leaves 3-foliolate, the basal ones often 4–5-foliolate; leaflets 5 mm. to 3 cm. long, 3–12 mm. or more wide, oblong-obovate, retuse or mucronulate, covered on both surfaces with minute black glands, glabrous above, minutely canescent beneath; racemes 3–9 cm. long; flowers loosely scattered; bracts very small, ovate, cuspidate; calyx canescent with white, silky hairs, the lobes glandular, obtuse or acutish; pod about 8 mm. long; beak short, stout, straight; seed compressed, obliquely ovoid, brown.

Intermediate between *P. tenuiflora* and *P. floribunda*. Differing from the latter in its less dense inflorescence and much broader leaflets and somewhat larger flowers and less pubescent or canescent appearance.

Texas—Drummond (II.) No. 123; (type); Lindheimer, No. 36 (1843); El Paso, Vasey (1881); on the Upper Colorado (1854), collector unknown.

New Mexico—Wright, No. 969?; Cobra Spring, W. B. Pearce (1878).

Arizona—Bear Mts., Rusby, No. 78 (1880); Oak Creek, Rusby (1883); Willow Springs, Palmer, No. 512 (1890); Oracle Camp, Sta. Catalina Mts., Lemmon (1881); Flagstaff, M. E. Jones, No. 3952 (1884); Flagstaff, Tracy and Evans, No. 276 (1887); Mexican Boundary Survey, No. 218; Fort Whipple, Coues and Palmer, No. 83 (1865); Fort Apache, Mrs. R. W. Hoyt (1893).

Mexico—Berlandier, No. 1749 (1828); Cañon of Guadalupe, Capt. E. K. Smith; Los Nogalos, Sonora, Capt. Smith.

8. PSORALEA FLORIBUNDA Nuttall.

Psoralea floribunda Nutt.; Torrey and Gray, *Flora N. Am.* 1: 300 (1838). Types (Nuttall) in Herb. Columbia College and (Pitcher) in Herb. Acad. Phila.

Erect 3 dm. to over 1 m. high, profusely branching, canescent, not glandular; petioles 5 mm. to 3 cm. long, mostly shorter than the leaflets; stipules 3–7 mm. long, subulate, sometimes reflexed; leaves 3–5 sometimes 7-foliolate; leaflets 1–3½ cm. or more long, 3–8 mm. wide, oblong, glandular on both surfaces, glabrous, rugose, with a few scattered hairs above, canescent with closely appressed white hairs beneath; peduncles 6–14 cm. long; spikes oblong or cylindrical, densely many flowered, the flowers at length interrupted and appearing almost as if whorled; bracts 2–3 mm. long, lanceolate, hirsute; calyx canescent, the lobes triangular, acute, the lower one the longest; pod ovoid, glabrous, light brown, covered with darker glands, beak short, stout, straight; seed 5 mm. long, compressed.

Montana—Belt Mts., Scribner, No. 25.

Wyoming—Laramie River, R. B. Hetz (1864).

Nebraska—Hayden (1853); Fort Pierre, Hayden (1853); Lancaster Co., Webber (1874).

Illinois—Pekin, Buckley; Carlisle, Buckley (1838); Augusta, S. B. Mead (1844), a specimen in Herb. Torrey with very long leaves and more slender inflorescence; Athens, Elihu Hall; H. H. Babcock.

Kansas—Miami Co., J. H. Oyster, No. 2146 (1883); Topeka, B. B. Smyth, Nos. 315 and 345 *b.* (1888 and 1890); Fort Riley, E. E. Gayle, No. 487 (1892); Hiawatha, A. S. Hitchcock.

Missouri—Cass Co., G. E. Broadhead (1863); Upper Missouri, Beck; Franklin, Th. Meehan (1871); Courtney, B. F. Bush (1891).

Colorado—Platte River, Coulter (1873).

Mississippi—N. Riehl (1846).

Maryland—Jackson Co. (1864), collector unknown.

Arkansas—Nuttall (type); Pitcher; Abert (1840); Leavenworth; between Illinois River and Neosho River, Engelman, No. 1059 (1835).

Indian Terr.—Between Fort Cobb and Fort Arbuckle, Palmer, No. 103 (1868).

Texas—Lindheimer, Nos. 157 and 373; Reverchon in Curtiss N. Am. Pl. No. 566; Wright.

New Mexico—Wright Nos. 968 and 969; Council Grove, Wislizenus, No. 415 (1846).

Arizona—Sta. Rita Mts., Pringle, No. 282 (1881).

Mexico—Berlandier, No. 1749.

9. PSORALEA LINEARIFOLIA Torr. and Gray.

Psoralea linearifolia Torr. and Gray, Fl. N. Am. 1: 300 (1838).

Type in Herb. Gray.

Erect, 3–6 dm. high, widely branching; stems not always glandular, glabrous or sparingly pubescent with appressed hairs; stipules 3–7 mm. long, lanceolate or setaceous; leaves sessile or short-petioled, 1–3-foliolate; leaflets 2–6 cm. or more long, 2–3 mm. wide, linear, rugose, glandular, glabrous or with a few appressed hairs; peduncles 8–18 cm. long; flowers blue, loosely scattered, 1–4 together on slender pedicels 4–8 mm. long; bracts 2 mm. long, ovate, acuminate; mature calyx campanulate, 4 mm. long, glandular, slightly pubescent, the lobes nearly equal; pod 8 mm. long, ovoid or oblong, glandular, with a short, stout, straightish beak; seed flat, oblique, dark brown.

Nebraska—Kearney, Mrs. A. A. Austin; Cañon near North Fork of the Platte River, Rydberg (1890).

Indian Terr.—Between Fort Cobb and Fort Arbuckle, Palmer, No. 102 (1868.) Comanche Plains on the Upper Canadian, Bigelow (1853).

Texas—Near Dallas, Reverchon; Reverchon in Curtiss, N. Am. Pl. No. 263 *a*; E. Hall, No. 126 (1872); near Fort Concho, V. Havard (1881).

Arkansas—Beyrich (type 1834).

PSORALEA LINEARIFOLIA ROBUSTA Coulter, Contr. U. S. Nat. Herb. No. 2: 34 (1890). A broader-leaved more robust form of the type.

Texas—Clarendon, Donley Co., Neally (1888.)

10. *PSORALEA DIGITATA* Nuttall.

Psoralea digitata Nutt.; Torr. and Gray Fl. N. Am. 1: 300 (1838). Type in Herb. Columbia College.

Psoralea campestris Nutt.; Torr. and Gray Fl. N. Am. 1: 301 (1838). Type in Herb. Columbia College.

Erect, branching, 3–6 dm. or more high, appressed canescent-hirsute throughout; stipules 5mm.–1 cm. long, lanceolate, sometimes reflexed; leaves mostly 5-foliolate (the upper ones sometimes 3-foliolate); pedicels rarely longer than the leaflets; leaflets 2–3½ cm. long, the largest 5 mm. wide on petioles 3–6 cm. long, rough, with a few dark glands and the midvein pubescent above, densely pubescent with white appressed hairs beneath; peduncles 18–20 cm. long; flowers in interrupted spikes; bracts obcordate, 5 mm. long, nearly as broad, sparingly glandular; calyx much enlarged in fruit, the lower lobe the longest; pod entirely enclosed in the calyx, hirsute, beak slender, straight; seed ovoid, grey, nearly 5 mm. long.

Dakota—Black Hills, W. H. Forwood.

Nebraska—Platte Plains, Nuttall (type of *P. campestris*); Upper Platte, Hayden (1853); Rydberg, No. 51 (1891).

Kansas—T. H. Oyster, No. 2125 (1887).

Arkansas—Red River, Nuttall (type); Beyrich (1834), Leavenworth.

Indian Terr.—Canadian River, Gordon, No. 11 (1848); between Fort Cobb and Fort Arbuckle, Palmer, No. 101 (1868); Canadian River, Bigelow (1853–4).

Texas.—Capt. Pope; Dallas, Reverchon in Curtiss N. Am. Pl. No. 553*; Dallas, Elihu Hall, No. 123 (1872).

Oklahoma Terr.—Kingfisher, M. A. Carleton, No. 184 (1891).

11. PSORALEA ARGOPHYLLA Pursh.

Psoralea argophylla Pursh, Fl. Am. Sept., 475 (1814). Type in Herb. Acad. Phila.

Psoralea incana Nutt. Fras. Cat. (1813), name only. Type in Herb. Acad. Phila.

Psoralea argophylla var. *decumbens*, A. Gray, Pac. R. R. Rep. 12: 41 (1860).

Roots thickened, rhizome often 30 cm. or more long, stems erect, 3–5 dm. or more high, branching, silvery canescent throughout; stipules $\frac{1}{2}$ –1 cm. or more long; petioles as long or somewhat longer than the leaflets; leaves 5-foliolate; leaflets $1\frac{1}{2}$ –4 cm. long, 6 mm. –2 cm. broad, oblong, or oblong-cuneate, obtuse or sometimes mucronulate, more or less canescent with silky white hairs on both surfaces, with a few scattered small black glands; peduncles much longer than the leaves; flowers two or three together in an interrupted raceme or spike; bracts ovate-lanceolate, acute 5–8 mm. long; calyx-lobes acuminate, the lower one over 1 cm. long and longer than the ovate straight beaked pod; seed flat, 4 mm. long, brownish.

North West Terr.—Moose Mt., Macoun (1880); Souris Plain (Assiniboia), Macoun (1887); Saskatchewan, Bourgeau (1857–8); Saskatchewan Plains, Macoun, No. 416; St. Peter's, Parry; Nicollet.

Montana—Elliott Coues (1874); Stendive, L. F. Ward (1883).

Dakota—Black Hills, W. H. Forwood; Glatfelter.

Minnesota—Dr. Sykes (1849); Upper Missouri River, Parry (1848); St. Anthony Falls, Torrey; Falls of St. Anthony, Dr. Houghton, No. 63; St. Anthony, T. J. Hale (1861); St. Peter's River Hall (1861); Fort Snelling, Hall (1861); Minnehaha, H. H. Babcock (1872); Winnebago City, H. W. Babcock (1871); Minneapolis, Sandberg, No. 278 (1891); Hennepin Co., Sandberg (1890); Fort Snelling, Mearns, No. 244 (1890).

Wisconsin—St. Croix, T. J. Hale (1861).

Iowa—C. C. Parry (1847); A. Commons; Emmet Co., R. J. Cratty; Ames, A. S. Hitchcock.

Nebraska—F. V. Hayden (1853); Fort Kearney, H. Engelmann (1858–9); Big Nemahah River to Fort Kearney, Fendler (1849); Ogallala, Earle (1880); Fort Niobrara, Fisher (1889);

Wilcox (1888); Saunders Co., Rydberg (1889); Kearney, Jesse H. Holmes (1889); Valenting, J. M. Bates (1889); G. D. Swezey, No. 22.

Utah—Capt. Bishop (1872).

Kansas—Fort Riley, Gayle, No. 546; (1892); Good Land, Smyth, No. 337 (1892); Manhattan, Phoebe Haines.

Missouri—Pursh (type); Nuttall; Little Muddy River, Buckley; Th. A. Culbertson (1850); Franklin, Th. Meehan (1871).

New Mexico—Fendler, No. 123 (1847); Cimarron River, Fendler, No. 137 (1847); also Fremont's 3d Expedition, No. 15 (1845).

12. *PSORALEA REVERCHONI* S. Wats.

Psoralea Reverchoni S. Wats. Proc. Am. Acad. 21: 447 (1886).

Erect, branching, 6 dm. or more high, pubescent, the upper portion hirsute with appressed white hairs; stipules subulate, nearly equalling the petioles; petioles shorter than the leaflets, leaves 3–5-foliolate; leaflets $1\frac{1}{2}$ – $3\frac{1}{2}$ cm. long, linear-oblong, acute at each end; flowers few in short, close spikes; bracts $1\frac{1}{2}$ cm. long, broadly ovate, cuspidate with a cordate base, pubescent and covered with brown glands; calyx 1 – $1\frac{1}{2}$ cm. long, gibbous, glandular, hirsute, ciliate with white hairs, the lobes lanceolate, the lower one the longest. Fruit not seen.

Texas—Johnson Co., Reverchon, Curtiss N. Am. Pl. 553 **;
Hood Co., Reverchon (type).

Indian Terr.—Between Fort Cobb and Fort Arbuckle, Palmer, No. 72 (1868).

13. *PSORALEA CYPHOCALYX* A. Gray.

Psoralea cyphocalyx A. Gray, Bost. Journ. Nat. Hist. 6: 172 (1850). Type in Herb. Gray.

Psoralea palmata Buckley, Proc. Phila. Acad. 451 (1861). Type in Herb. Acad. Phila.

Caudex dilated below the summit into a globular tuber nearly 2 cm. in diameter; stem 8 dm. or more high, erect, strigose-pubescent, somewhat paniculate above; stipules linear, 1 cm. or less long; leaves 3–5-foliolate, lower petioles as long as the leaflets; leaflets 4–10 cm. long, 8 mm. wide, lanceolate-linear, glandular, glabrous and rugose above, sparingly appressed strigose-pubescent beneath; flowers scattered on a short spike; pedicels nearly 5 mm. long; bracts ovate, cuspidate, about the length of the pedicels; calyx pubescent, conspicuously ciliate with white hairs,

covered with brown glands, strongly gibbous-saccate at the upper side, lobes lanceolate, the upper ones the longest. Fruit not seen.

Texas—Lindheimer, Nos. 30, 593 (1847), also No. 44 (1849-50);

Ch. Wright, No. 114 (1849); Bandera, Reverchon, No. 1512;

Reverchon, No. 813; South of Fort Belknap, Buckley (1861).

The last specimen has very broad leaves, over 15 cm. long, foliaceous stipules and broad scarious scales at the base of the stem.

14. PSORALEA CANESCENS Michx.

Psoralea canescens Michx. Fl. Bor. Am. 2: 57 (1803). Type in Herb. Michx.

Erect from a long, (rarely 1 m.) fusiform, somewhat farinaceous root, branching, canescent; stipules lanceolate, subulate, less than 1 cm. long; basal leaves 3-foliolate, upper ones often 1-foliolate, sessile or short petioled; leaflets orbicular-obovate narrowed to the petiole, 2-5 cm. or more long, minutely glandular, glabrous above except the somewhat hairy midvein, appressed canescent beneath; peduncles about twice as long as the leaves; flowers in small clusters or scattered in loose spikes; bracts 4-6 mm. long, ovate, acuminate; calyx gibbous on the upper side, covered with brown glands, the lobes triangular, ovate, the two upper ones much shorter than the lower; pod 1 cm. long, glandular, with a straight beak that is somewhat longer than the calyx; seed nearly orbicular, flattish, brown.

North Carolina—M. A. Curtis (1842).

South Carolina—Aikin, Ravenel.

Georgia—Beyrich; Baldwin; Leconte; Buckley; Neisler.

Florida—Buckley; Torrey; between Tallahassee and St. Marks,

Rugel (1843); Rosewood, Garber (1876); Chapman; Bur-

rows; pine barrens, Mary Reynolds (1876); near Braidentown,

J. H. Simpson (1891); near Jacksonville, Curtiss, N. Am. Pl.

No. 557.

Alabama—Ch. Mohr (plants with abnormally large fruit).

15. PSORALEA CUSPIDATA Pursh.

Psoralea cuspidata Pursh, Fl. Am. Sept. 741 (1814). Type in Herb. Acad. Phila.

Psoralea macrorhiza Fras. Cat. (1813), name only.

Psoralea cryptocarpa Torr. and Gray, Fl. N. Am. 1: 301 (1838).

Psoralea Ræmeriana Scheele, Linnæa, 21: 463 (1848).

Erect, 4–6 dm. or more high, stout, branching, glabrous below, more or less canescent above; stipules 1–2 cm. long, lanceolate-subulate; leaves 5-foliolate on petioles not longer than the leaflets; leaflets 2–4 cm. long, elliptical-oblong, glandular, glabrous above, canescent beneath; flowers short-pedicelled, crowded in short dense, 3–5 cm. long spikes on peduncles that are longer than the leaves; bracts $1\frac{1}{2}$ – $2\frac{1}{2}$ cm. long, lanceolate, cuspidate, exceeding the glandular calyx; calyx ciliate or gibbous on the upper side, wide at the sinuses, the two upper lobes shorter than the attenuate, triangular-lanceolate lower ones; pod glabrous, about 8 mm. long, with a short recurved beak, entirely enclosed in the calyx; seed elliptical, 5 mm. long, black or brownish, shiny.

North West Terr.—St. Peter's, Parry (1848); Nicollet, No. 170 (1839).

Dakota—"Upper Missouri River," Buckley (1853).

Kansas—Smoky Hill Fork, Parry, No. 34 (1867); Morton Co., M. A. Carleton, No. 148 (1891); Guerneville (1891).

Nebraska—Mouth of the Yellowstone, Hayden, No. 407 (1854).

Indian Terr.—Plains of the Canadian, Bigelow.

Arkansas—Leavenworth.

Texas—Buckley, Drummond, No. 124; Industry, Lindheimer, No. 198 (1844); also No. 372 and 340 (1845); Austin, E. Hall, No. 122; Dallas Co., Reverchon in Curtiss, N. Am. Pl. No. 563 **.

New Mexico—Ch. Wright (1851); Cimarron River, on the Santa Fé road, Wislizenus, No. 450 (1846); also Frémont, No. 171 (1845), no locality.

16. PSORALEA PENTAPHYLLA L.

Psoralea pentaphylla L. Sp. Pl. 764 (1753).

Decumbent or assurgent, from long and tuberous root-stocks, stems branching from the base, 1–2 dm. or more long, glandular and more or less hirsute, with short rigid appressed white hairs; petioles 3–5 cm. long; stipules 3 mm. long, lanceolate; leaves 3–5-foliolate; leaflets $1-2\frac{1}{2}$ cm. long, 3–7 mm. wide, lanceolate, sparingly hirsute on both surfaces, less so above; peduncles much shorter than the leaves; flowers 3–8 together in capitate racemes; bracts minute, ovate; calyx-lobes lanceolate, acute; pod over 1 cm. long, hirsute, the straight beak fully half the length of the pod: seed 5 mm. long, elliptical or nearly orbicular, grayish.

Mexico—Near San Luis Potosi, Shaffner, No. 833; Hartweg, No. 62; San Luis Potosi, Parry and Palmer, No. 142; near Chihuahua, Pringle, No. 17.

17. *PSORALEA ESCULENTA* Pursh.

Psoralea esculenta Pursh, Fl. Am. Sept. 475 (1814). Type in Herb. Acad. Phila.

Psoralea esculenta Fras. Cat. (1813), name only.

Psoralea brachiata Douglas; Hooker Fl. Bor. Am. 1: 137, t. 53 (1829).

Root fusiform, 5 cm. or more long, not farinaceous; stems erect, spreading or assurgent, 1–3 dm. high, sometimes acaulescent, with a few scarious scales below, hirsute with somewhat weak hairs; stipules 2 cm. or more long, ovate-lanceolate, ciliate, rarely foliaceous; petioles longer than the leaflets; leaves 5-foliolate; leaflets 2–6 cm. or more long, 1–2½ cm. wide, oblong-cuneate, obtuse or acutish, sometimes mucronulate, glabrous above, hirsute beneath; flowers crowded in oblong spikes 3–8 cm. long on peduncles mostly much longer than the leaves (rarely only as long); bracts 1–1½ cm. long, ovate-lanceolate, cuspidate, hirsute; calyxlobes 1–1½ cm. long, foliaceous, hirsute, becoming coriaceous with age, the tube strongly gibbous on the upper side, the two upper lobes shorter than the lower ones; pod enclosed in the calyx, hirsute, with the beak nearly 3 times as long as the 6 mm. long black seed.

The Pomme de Prairie and Pomme blanche of the Canadian voyageurs.

Saskatchewan—Bourgeau (1858).

Northwest Terr.—Moose Mt., Macoun; Parry (1848; Nicolle, No. 169.

Montana—Tweedy (1889).

Iowa—Emmet Co., Craty.

Wisconsin—Black Earth, Hale (1861); Arena, Hale; Dane Co., J. A. Lapham (1858).

Nebraska—From Niobrara River to Fort Pierre, Hayden (1859); Sage Creek, Hayden (1859); Bad Lands, Hayden (1853); Fort Clark, Hayden (1856); Omaha, Smech (1893); Ellenwood, T. A. Williams; Kearney, Mrs. A. A. Austin; Fort Niobrara, Wilcox; Lancaster Co., Webber.

Missouri—Nuttall; Willard; T. A. Culbertson (1850); G. C. Broadhead (1873); Potosi, Riehl (1846); Allentown, G. W. Letterman (1875); Buckley.

Kansas—Manhattan, Bertha Hederstrow (1892); Fort Riley, E. E. Gayle (1892); Topeka, B. B. Smyth, No. 341 (1891); Manhattan, Kellerman (1888).

Minnesota—Upper St. Peter's, C. C. Parry (1848); Cannon Falls, Sandberg, No. 344 (1891).

Indian Terr.—M. A. Carleton, No. 112 (1891).

Dakota—Box Elder Creek, Rusby (1887).

Texas—Ch. Wright; Dallas, Reverchon; Elihu Hall, No. 121; Hempstead, Elihu Hall, No. 128 (1892); Freestone Co., J. Joor, No. 15 (1878); Prairies of the Rio Grande, Emanuel Meyer; near Nagadoches, Leavenworth; Parry.

Louisiana—Camp Sabine, Leavenworth (1837).

18. PSORALEA HYPOGÆA Nutt.

Psoralea hypogæa Nutt.; Torr. and Gray, Fl. N. Am. 1: 302 (1838). Type in Herb. Columbia College.

Psoralea hypogæa var. *scaposa* A. Gray, Bost. Journ. Nat. Hist. 4: 175 (1850). Type in Herb. Gray.

Roots ovoid, globose or fusiform, 3–4 cm. long, the whole plant sometimes 10 cm. high; stem with a few scarious scales; petioles usually much longer than the leaflets; leaves 5–7-foliate; leaflets 2–5 cm. long, 5–7 mm. wide, linear-lanceolate, or linear-oblong, acutish, glabrous or with a few scattered hairs above, appressed white hirsute beneath; flowers in capitate racemes varying from nearly sessile to somewhat exceeding the leaves; bracts scarious, ovate, acute, hirsute; calyx-lobes lanceolate, cuspidate, hirsute, the two upper lobes shorter than the lower ones, the middle one of which is broadly lanceolate; pod over 1 cm. long, somewhat hirsute, with a long slender attenuate beak; seed ovoid, about 5 mm. long, wrinkled, reddish brown.

Differing from *P. esculenta* in its smaller size, more rigid and appressed hairs, and narrower leaflets. The pubescence of *P. esculenta* is silky, often nearly woolly and more spreading.

Nebraska—Platte Plains, Nuttall (type).

Indian Terr.—Canadian River, Gordon (1848).

Colorado—Colorado Swamps, Jones, No. 934, (1879); Sandy Plains, Greene (1872).

Texas—West of the Brazos River, Reverchon; Lindheimer, No. 594; Wright, No. 115; Parry (1867), labelled *P. esculenta*; Wright, No. 115 (1849), labelled var. *scaposa*; near Austin, Buckley (1860).

New Mexico—Upper Canadian, A. Gordon (1848); Cold Spring, South of Cimarron River, Wislizenus, No. 478 (1846).

19. PSORALEA SUBACALIS Torr. and Gray.

Psoralea subacaulis Torr. and Gray, Fl. N. Am. 1: 302 (1838).

Type apparently lost.

Nearly acaulescent, 1–2 dm. high from a long subterranean stem, root oblong-fusiform, tuberous, 5–11 cm. long; stem and base of plant covered with large, yellowish, scarious scales; petioles and peduncles villous with silky white spreading hairs; leaves 5–7-foliate; stipules 1–2 cm. long, ovate-lanceolate; leaflets 1½–3 cm. long, 6–8 mm. wide, obovate-oblong, obtuse or acutish, minutely glandular, glabrous except the ciliate margins and the appressed white-hirsute midvein beneath; peduncles as long or longer than the leaves; flowers purple; bracts ovate-lanceolate, 1–1½ cm. long, ciliate; calyx densely hirsute with white hairs, the lower lobe spatulate, obtuse, the others acutish and shorter. Fruit not seen.

Tennessee—Near Nashville, Gattinger, in Curtiss, N. Am. Pl., No. 559, from the original* locality, where Dr. Roane first collected it; near Nashville, Lesquereux (1855); near Nashville, G. H. Hubbard, No. 559 (1880).

20. PSORALEA CALIFORNICA S. Wats.

Psoralea Californica S. Wats. Proc. Am. Acad. 12: 251 (1876).

Type in Herb. Gray.

Psoralea mephitica S. Wats. Proc. Am. Acad. 14: 291 (1879).

Type in Herb. Gray.

Root ligneous, 10 cm. or more long; stems 1–2 dm. high, often several from the same root, with a few scarious scales, apparently acaulescent, but spreading or decumbent, sometimes branching from the base, villous with more or less spreading white hairs, especially so on the inflorescence; stipules broadly ovate, scarious; leaves 5-foliate, on petioles 5–10 cm. long; leaflets 2–3 cm. long, 1–2 cm. wide, rhomboid-obovate or cuneate-obovate, obtuse or retuse, sometimes apiculate, more or less pubescent on both surfaces with appressed short white hairs;

* Torr. & Gray Fl. N. Am. 1: 302.

peduncles somewhat shorter than the petioles, 2–3 cm. long; flowers on slender lax pedicels, in dense, capitate or elongated spikes; bracts ovate, long-acuminate, scarious, but little shorter than the calyx; calyx conspicuously villous with spreading hairs, somewhat gibbous above, the lobes lanceolate, 8–10 mm. long, the lower lobe the broadest; pod scarious, 1 cm. long, somewhat villous, with a straight slender beak; seed about 5 mm. long, ovoid, greenish or black, smooth and shining.

California—McGinnis Ranch, head of Salinas River, Palmer (1876) type; San Rafael Mts., Santa Barbara Co., H. C. Ford (1887); Head waters of Eel River, Lake Co., Volney Rattan, No. 12 (1884); base of mountains, Mojave region, S. B. & W. F. Parish, No. 1284; Lake Co., M. K. Curran (1884); Mt. Diablo, Geo. W. Davidson (1892); Mt. Diablo, Greene (1892).

Lower California—Japa, Orcutt (1884).

Arizona—Peach Springs, Lemmon, No. 4146 (1884); Buckskin Mts., Jones (1891); Navajo Springs, Jones (1890).

Utah—Beaver City, Palmer, No. 97 (1877); Mrs. Thompson (S. Utah, 1872); Garfield Co., A. L. Siler (1883).

Colorado—Westwater, alt. 4,500 ft., Jones (1891).

21. *PSORALEA CASTOREA* S. Wats.

Psoralea castorea S. Wats. Proc. Am. Acad. 14: 291 (1879).
Type in Herb. Gray.

Root ligneous, about 8 cm. long; stem erect, 10–15 cm. high with a few scarious scales, the whole plant covered with closely appressed rigid white hairs; stipules ovate-lanceolate, scarious, persistent; petioles 8–10 cm. or more long; leaves 3–5 foliolate; leaflets 3–5 cm. long, 2–5 cm. wide, cuneate-obovate, rounded, retuse or acutish; peduncles shorter than the petioles; flowers in dense capitate spikes about 3 cm. long; bracts ovate or lanceolate, acute, less than 5 mm. long; calyx slightly gibbous above, the four upper lobes lanceolate, attenuate, nearly as long as the cuneate or spatulate lower one, which is over 1 cm. long; pod 8 mm. long, the attenuate beak 14–15 mm. longer; seed about 7 mm. long, flattened, transversely wrinkled, light brown.

In the original description the large lower calyx-lobes have been mistaken for bracts. It differs mainly from *P. Californica* in its closer, whiter pubescence, the size of the bracts, which in the specimens seen were not scarious, the shape of the calyx-lobes, the pod, which again is not scarious and has a much longer and more slender beak, and the wrinkled seed

Prof. M. E. Jones* claims that *P. castorea* and *P. mephitica* are identical, in which I can hardly concur, as the series of specimens examined seem to be very constant to the characters noted above.

Utah—Beaver City, Palmer, No. 96 (1877), type.

California—Mojave River, Parish Bros., No. 1283 (1882); Mojave Desert, Lemmon, No. 3119 (1884); near Colico, Mojave Desert, Lemmon (1884).

§ 2. LEAVES PINNATELY 3-FOLIOLATE (RARELY UNIFOLIOLATE).

Flowers in capitate or short, crowded, oblong spikes.

Flowers small (5 mm. or in *P. simplex* often 1 cm. long).

Pods obliquely orbicular, transversely reticulate or wrinkled.

Leaves 1-foliolate, leaflets linear-lanceolate, bracts setaceous.

22. *P. virgata*.

Leaflets and bracts lanceolate and pubescent.

23. *P. simplex*.

Pods ovoid, not reticulate.

Plant low, branches trailing.

24. *P. rhombifolia*.

Plant erect, leaflets ovate or orbicular, crenate-dentate.

25. *P. Americana*.

Flowers large (1–2 cm.).

Plants glabrous or nearly so.

Flowers few, slender pedicelled; pods obliquely ovate, reticulate, stems trailing.

26. *P. melanocarpa*.

Flowers in crowded heads; pods ovate, rough, hardly wrinkled.

27. *P. rigida*.

Pods ovate, membranaceous, calyx inflated in fruit.

28. *P. physodes*.

Leaflets elliptical, stipules large and foliaceous.

29. *P. stipulata*.

Plants more or less tomentose or densely pubescent throughout;

bracts 15 mm. long, broadly ovate.

30. *P. strobilina*.

Flowers in more or less elongated cylindrical spikes.

Flowers small (5 mm.); plants glabrous or nearly so; pods transversely wrinkled.

Leaflets 5 mm.–2 cm. broad, pods nearly 5 mm. long, nearly orbicular.

31. *P. pedunculata*.

Leaflets 2½–6 cm. broad; pods nearly 1 cm. long, obliquely ovate, roughened with conical tubercles.

32. *P. Onobrychis*.

Flowers large (1–3 cm.).

Plants glabrous or nearly so, stems conspicuously roughened with elevated glands.

33. *P. glandulosa*.

Stems glabrous, inflorescence conspicuously villous with white hairs.

34. *P. macrostachya*.

Stems prostrate, leaves orbicular or nearly so, very long

petioled; inflorescence elongated, hirsute.

35. *P. orbicularis*.

*Zöc 2: 244 and 3: 285.

22. PSORALEA VIRGATA Nutt.

Psoralea virgata Nutt. Gen. 2: 104 (1818). Type in Herb. Columbia College.

Psoralea simplicifolia Baldw.; Torr. and Gray, Fl. N. Am. 1: 303 (1838.) Type in Herb. Acad. Phila.

Root small, tuberous; stem erect, 2–6 dm. high, angled, simple or branching from the base, nearly glabrous or the upper part pubescent; stipules setaceous, 5–8 mm. long; leaves remote, 1-foliolate or the radical ones 3-foliolate; petioles shorter than the leaflets; leaflets 3–10 cm. long, 4–10 mm. wide, linear, the basal ones rarely ovate or ovate-lanceolate, glandular, sparingly pubescent on the veins and margins; flowers crowded in short spikes 2–3 cm. long; bracts subulate, nearly twice as long as the calyx-lobes; calyx very small, hirsute, the lower lobe the longest; pod 5 mm. long, obliquely orbicular, compressed, transversely wrinkled, with a minute recurved beak; seed flattish, brown.

Georgia—Near St. Mary's, Baldwin (type).

Florida—Between St. John's and St. Augustine, Rugel, No. 164 (1848). Chapman, no locality; near Jacksonville, Curtiss, No. 553; C. T. Powell (1872); St. Augustine, Mary Reynolds.

Also specimens in Herb. Acad. Phila. from Herb. Baldwin, labelled "*Psoralea angustifolia* U. S. 228. Leaves rarely ternate."

23. PSORALEA SIMPLEX Nutt.

Psoralea simplex Nutt.; Torr. and Gray Fl. N. Am. 1: 303 (1803). Type in Herb. Columbia College.

Erect, simple or one or two stems from the same root, 3–6 dm. high, more or less pubescent throughout; stipules 1 cm. long, setaceous; leaves 3-foliolate, sessile or very short-petioled; leaflets 2–6 cm. long, 5–12 mm. wide, lanceolate, acute, mucronate, glandular; peduncles 2–3 times the length of the leaves; flowers in oblong spikes; bracts very small, linear-lanceolate, acuminate, hirsute with white hairs; calyx hirsute, the lobes somewhat obtuse, the lower one the longest; pod 4–5 mm. long, obliquely orbicular, transversely reticulate; beak somewhat oblique; seed flat, very small, brownish.

Arkansas—Cedar Prairies, Red River, Nuttall (type); Dr. Edwards (1854); Engelmann (1835).

Louisiana—Pointe à la Hache, Langlois (1886); Hale; Paroisse des Rapides, Steinhauer (1839).

"*South Mississippi*"—E. H. Gard. (1859).

Indian Terr.—Near Atoka, C. S. Sheldon, No. 60 (1891).

Texas—Drummond, No. 122 (1835); Wilground, Hempstead, Elihu Hall (1892); Rio de la Trinida y Bejax (1828) lab. *melilitoides*.

24. PSORALEA RHOMBIFOLIA Torr. and Gray.

Psoralea rhombifolia Torr. and Gray, Fl. N. Am. 1: 303 (1838). Type in Herb. Columbia College.

Decumbent or trailing (rarely erect) from a somewhat thickened root, angled below, sparingly pubescent above; leaves 3-foliolate, on petioles 2–4 cm. or more long, upper ones nearly sessile; stipules 3–5 mm. long, ovate or lanceolate; leaflets 8 mm. to 3 cm. long, ovate-rhomboid (when very small, nearly orbicular), the terminal one acutish, the lateral ones obtuse; flowers dark blue or reddish, in small capitate racemes, on peduncles 3–8 cm. long; bracts about 3 mm. long, elliptical, ciliate; calyx 8 mm. long, somewhat gibbous above, the lobes nearly equal, triangular, acute, spreading; pod mostly 1 cm. long, hirsute, with a long straight beak; seed elliptical, nearly 5 mm. long, brownish, roughened with minute darker glands or tubercles.

Texas—Lindheimer, No. 35 (1843), also 291 (1849–50); Dallas, Reverchon, No. 213 and 563* (1881); Corpus Christi Bay, Palmer, No. 223 (1880); Drummond, No. 134 (type); Ch. Wright; Hockley, F. W. Thuron (1891).

Mexico—Sierra Madre, forty miles east of Saltillo, Palmer, No. 254 (1880); Monterey, Palmer, No. 222.

25. PSORALEA AMERICANA L.

Psoralea Americana L. Sp. Pl. 763 (1753).

Psoralea dentata D.C. Prodr. 2: 221 (1825).

Psoralea corylifolia Britton, Bull. Torr. Bot. Club, 17: 313 (1890), not of Linn.

Somewhat shrubby at the base, erect, over 3 dm. high, branching, glabrous, glandular throughout; stipules lanceolate, acuminate; leaves 3-foliolate; petioles 4–6 cm. long; leaflets 2–3½ cm. long, the terminal one sub-orbicular, the lateral ones obliquely ovate, obtuse, irregularly crenate-dentate; racemes spicate, elongated, pubescent, much exceeding the leaves, or when young shorter and almost capitate; bracts lanceolate, shorter than the calyx; calyx-lobes pubescent, the lower one broader and longer than the two short upper ones; pod glabrous, barely longer than the calyx lobes; seed 3 mm. long, densely covered with minute glandular warts.

Florida—Apalachicola, Chapman.

In his description of this plant Linnæus gives America as its habitat. DeCandolle changed the name to *P. dentata*, and gives Madeira as its habitat. Kuntze, in Rev. Gen. Plant i. 193, notes that the plant undoubtedly grows wild on the island of Madeira, and therefore is not American, but re-establishes the Linnæan specific name, though under the generic name of *Lotodes*. The species has been collected in Florida, and doubtless the plant from which Linnæus made his original description came from one of the Southern States. It would be interesting to know how well it is established there. Dr. Chapman's plant is preserved in the Herbarium of Columbia College.

26. PSORALEA MELANOCARPA Benth.

Psoralea melanocarpa Benth.; Hemsl. Biol. Centr. Am. 1: 234 (1879). Type in Herb. Kew.

Shrubby at the base; stems trailing or spreading, sparingly pubescent with appressed white hairs; stipules 6–10 mm. long, lanceolate, long-acuminate; leaves 3-foliolate; petioles 3–6 cm. long; leaflets, 4–7 cm. long, ovate-lanceolate, acute, mucronulate, glandular, nearly glabrous above, sparingly pubescent beneath; peduncles 12 cm. or more long, exceeding the leaves; racemes oblong; flowers few, slender pedicelled; bracts 6 mm. long, ovate, acuminate; calyx lobes linear, acuminate, nearly as long as the pod; pod obliquely ovate, somewhat twisted, transversely reticulate and somewhat tuberculate, beak short, recurved; seed 3–4 mm. long, elliptical, much smaller than the pod.

Mexico—Coulter, No. 561; Parry & Palmer, No. 142; near Monterey, Pringle, No. 2275 (1888).

27. PSORALEA RIGIDA Parish.

Psoralea rigida Parish, Bull. Torr. Bot. Club, 19: 91 (1892).

Erect, 3–6 dm. high, glandular, sparsely villous, with short intermingled black and white hairs; petioles 2 cm. or more long; stipules lanceolate, leaflets ovate-lanceolate, 3–5 cm. or more long, glabrous, rigid; peduncles shorter than the leaves; flowers in capitate racemes; bracts lanceolate, much shorter than the flowers; calyx 1 cm. long, lobes acuminate, the upper one much the longest; pod 8–10 mm. long, ovoid, coriaceous, with a short, stout, straight beak (under a lens, with a few white hairs); seed elliptical, 7 mm. long, black.

California—Oak Grove, San Diego Co., Parish, No. 643 (1882).

28. PSORALEA PHYSODES Douglas.

Psoralea physodes Douglas; Hook. Fl. Bor. Am. 1: 136 (1830).

Erect, simple, 3–5 dm. high, glabrous or with a few weak, mostly black hairs; stipules 4–6 mm. long, lanceolate, reflexed; leaves 3-foliolate; leaflets $2\frac{1}{2}$ –5 cm. long, 2–3 cm. wide, broadly rhomboid-ovate, acute, mucronate, glandular; peduncles 3–9 cm. long; flowers in capitate racemes; bracts 5 mm. long, elliptical; calyx 8–10 mm. long, inflated, lobes triangular, glabrous, the margins ciliate with dark hairs; pod membranaceous, 5 mm. long, somewhat compressed (under a lens, with a few scattered black hairs), seed greyish.

British Columbia—Near Victoria, Fletcher (1885).

Oregon—Wahlamet, Nuttall; Portland, L. F. Henderson, No. 10; San Juan Island, Lyall (1858); Tolmie; E. Hall, No. 106 (1871); Douglas; Brushlands, Howell (1880).

Washington—Pugallup, Puget Sound, Engelmann (1880); J. M. Grant (1880); Port Townsend, Th. Meehan (1883).

California—Near Monterey, Brewer, No. 673; Gavillari Peak, Brewer, No. 752; Walnut Creek, Brewer, No. 1032; New Almaden, Torrey, No. 111 bis (1865); Samuels; Douglas; East of Cascade Mountains, Wilkes, No. 454; near Auburn, Lemmon (1883); Oakland Hills, Bolander (1861); Mack West's Creek, Bigelow (1853–4); Bridges, No. 75; Monterey, Parry (1850).

29. PSORALEA STIPULATA Torr. and Gray.

Psoralea stipulata Torr. and Gray, Fl. N. Am. 1: 688 (1840).

Type in Herb. Columbia College.

Ascending, branching from the base, 3–5 dm. high, not glandular, nearly glabrous; petioles 2–3 cm. long; leaves 3-foliolate; stipules 1–1 $\frac{1}{2}$ cm. long, foliaceous, lanceolate-ovate or elliptical; leaflets 3–4 $\frac{1}{2}$ cm. long, ovate or elliptical, obtuse, mucronulate, reticulate beneath; peduncles about as long as the leaves; racemes capitate; bracts 5–10 mm. long, ovate, cuspidate, somewhat scarious, deciduous; calyx slightly pubescent, the lower lobe the longest. Fruit not seen.

Ohio—Falls of the Ohio, Rock Island, Wm. Jones (June 8, 1839, type); Rock Island, Short (1840–60).

Indiana—New Albany, A. Clapp.

In the collections of C. W. Short, preserved in the Herb. Acad. Phila., there are notes to the effect that he never found this plant

in fruit growing wild, and that he cultivated it vainly for years. His collections of *P. stipulata* in the herbaria examined, cover a period of some twenty years.

30. PSORALEA STROBILINA Hook. and Arn.

Psoralea strobilina Hook. and Arn. Bot. Beechey 332 (1840).

Psoralea macrostachya β Torr. and Gray, Fl. N. Am. 1: 304 (1838) not of D.C.

Stems 6–9 dm. high, striate, tomentose and glandular throughout; stipules over 1 cm. long, ovate, cuspidate, ciliate, somewhat scarious; petioles 3–6 cm. or more long; leaves 3-foliolate; leaflets 3–7 cm. long, ovate or oval, the terminal one somewhat rhomboid, acutish, sometimes obtuse, rarely mucronulate, pubescent above with black glands, tomentose beneath; peduncles exceeding the leaves; spikes 2–5 cm. long, oblong, densely hirsute; bracts over 1½ cm. long, broadly ovate, acuminate, hirsute, mostly enclosing the flower; calyx-lobes lanceolate, cuspidate, the lower lobes broader and longer than the attenuate upper ones; fruit not seen.

California—Douglas (type); Roadsides to Santa Cruz, Bolander; Oakland Hills, near San Francisco, Torrey, No. 113 bis.

31. PSORALEA PEDUNCULATA (Mill.).

Hedysarum pedunculatum Mill. Gardn. Dict. No. 17 (1768), not *Psoralea pedunculata* Ker, Bot. Reg. t. 228 (1817), which is *P. sericea* Poir. (1804.) Type in Herb. Mus. Br.

Trifolium psoralioides Walt. Fl. Car. 184 (1788). Type apparently lost.

Psoralea melilotoides Michx. Fl. Bor. Am. 2: 58 (1803). Type in Herb. Michx.

Psoralea Melilotus Pers. Syn. 2: 347 (1807).

Melilotus psoralioides Nutt. Gen. 2: 104 (1818).

Psoralea eglandulosa Ell. Bot. N. C. and Ga. 2: 198 (1824).

Psoralea gracilis Chapm.; Torr. and Gray, Fl. N. Am. 1: 303 (1838). Type in Herb. Columbia College.

Erect, 3–8 dm. high, from a long rootstock, simple or branching from the base; stipules 4–5 mm. long, setaceous; petioles shorter than the leaflets; leaves remote, 3-foliolate, rarely 4–5-foliolate; leaflets 4–7 cm. long, 1–2 cm. wide, lanceolate, acute, rarely ovate and obtuse, glabrous except the veins and margins, which are very sparingly hirsute; peduncles much exceeding the

leaves; flowers in loose spikes; bracts 1 cm. long, glandular, broadly ovate, much imbricated, the cuspidate apex longer than the flowers; calyx-lobes acute, glandular, the lower lobe the longest; pod 4 mm. long, 5 mm. wide, nearly orbicular, compressed, transversely wrinkled with a minute recurved beak; seed orbicular, flat, brown.*

[There is a specimen of this plant in the Linnæan Herbarium in the place of *Hedysarum viridiflorum* L., as indicated on the sheet by Dr. Asa Gray. It is out of place, however; the specimen of *Hedysarum viridiflorum* on which Linnæus founded the species is the plant of Gronovius preserved in the Herbarium of the British Museum of Natural History, and is *Meibomia viridiflora* (L.) Kuntze. N. L. B.]

Washington—Seattle, Ch. V. Piper., No. 58 (1891).

Indiana—New Albany, A. Clapp.

Illinois—Rafinesque in Herb. Acad. Phila.; Salem, W. S. Bebb; Maysville, Buckley (labelled "*eglandulosa*").

Missouri—Jefferson City, Knause (1869); Garden Gap, Frank Bush (1888); Paris Springs, J. W. Blankinship (1887).

Kansas—Cherokee Co., J. H. Oyster, No. 2133 (1887).

Virginia—Petersburg, M. Tuomey; near Suffolk, A. Heller, No. 959 (1893).

North Carolina—Near Salisbury, A. A. Heller, No. 30 (1890).

South Carolina—Beck (labelled *P. lanceolata*); Pine Barrens, near Society Hill, John Donnell Smith.

Georgia—Jessup Co., T. H. Kearney (1893).

Kentucky—Oaklands, Short; Big-hill, Madison Co., Short.

Tennessee—Near Dandridge, Rugel (1842, labelled *P. eglandulosa* Ell.).

Arkansas—Nuttall; F. L. Harvey, No. 13 (a monstrosity with foliaceous calyx-lobes in Herb. Gray; Pitcher.

Georgia—Baldwin; Leconte; S. H. Wright.

Louisiana—Hall; Carpenter (1841).

Alabama—Buckley (1847); Thomas W. Peters; La Grange, N. R. Hatch; G. R. Vasey (1878).

Florida—Chapman; between Quincy and Chattahoochee, Chapman (1836); Quincy, Chapman, (lab. var. *gracilis*).

Texas—Wright; (also, Wright sp., lab. *P. eglandulosa* in Herb. Gray); Denison, J. H. Oyster (1883).

32. PSORALEA ONOBRYCHIS Nutt.

Psoralea Onobrychis Nutt. Gen. 2: 104 (1818).

Stylosanthes racemosa Nutt. Fras. Cat. (1813), name only.

Psoralea (?) *latifolia* Torr. Ann. Lyc. N. Y. 2: 176 (1828).

Erect, 1–1½ m. or more high, more or less finely pubescent throughout; petioles 4–7 cm. or more long; stipules 8–10 mm. long, setaceous; leaves 3-foliolate; leaflets 5–10 cm. or more long, 2½–6 cm. wide, ovate, acuminate, nearly glabrous above, ciliate, sparingly pubescent with scattered hairs beneath; peduncles much exceeding the leaves; spikes long, slender; flowers scattered, very small; bracts 3 mm. long, setaceous; calyx-lobes obtuse; pod 1 cm. long, ovate, black, slightly twisted at the apex, transversely reticulate, roughened with conical tubercles; seed elliptical, 6 mm. long, red brown.

Canada—Nicolet (1841); Near Ottawa, M. S. Bebb (1879).

Indiana—New Albany, A. Clapp.

Illinois—Peoria, A. J. Heading; Menard Co., Hall (1861); Athens, Hall (1863); Pekin, No. 8 (1837), collector unknown.

Ohio—Columbus, Sullivant (1840); Columbus, J. A. Lapham.

Missouri—Beck; H. Eggert (1877); near St. Louis, Baldwin; St. Louis, Engelmann (1841).

Tennessee—Between Dandridge and Knoxville, Rugel (1842); Knox Co., T. H. Kearney (1893).

Kentucky—High cliffs, Kentucky River, Short.

33. PSORALEA GLANDULOSA L.

Psoralea glandulosa L. Sp. Pl. Ed. 2, 1075 (1763).

Psoralea lutea Molina, Sagg. 163 (1782).

Psoralea Cullen Poir. Encycl. 5: 685 (1804).

A low shrub, 1 m. or more high, glabrous (except the racemes), covered throughout with elevated black glands; leaves 3-foliolate, on petioles somewhat shorter or the length of the leaflets; leaflets lanceolate or ovate-lanceolate, acute, 3–5 cm. long, 1–1½ cm.

* In the Schweinitz Herbarium there is a specimen labelled *P. peduncularis* Raf. I have not been able to find a published reference to that name.

wide; stipules minute, subulate; racemes 10–15 cm. long, usually much longer than the leaves; bracts 3 mm. long, ovate, cuspidate; calyx-lobes conspicuously nerved, acute, glabrous, nearly equal; pods exceeding the calyx-lobes, elliptical, hirsute, with a short, straight beak; seed 5 mm. long, elliptical, brown.

Chili—Dr. Styles, near Santiago, Ball (1882); Reynolds; Capt. Wilkes (1838–42); Gay; Mertens; Gillies, No. 257; W. Lechler; Valparaiso, Wilkes; near Valparaiso, Rusby, No. 956; G. Kunze (1839); W. H. Statin (1884–85).

California—Near Berkeley, Greene (1881).

34. PSORALEA MACROSTACHYA DC.

Psoralea macrostachya D.C. Prod. 2: 220 (1825).

Erect, 3 dm. to 3 m. high, branching, the stems glabrous or nearly so, otherwise the pubescence very variable; stipules 3–4 mm. long, subulate; leaves 3-foliate; leaflets 2–8 cm. or more long, 1–7 cm. wide, ovate or ovate-lanceolate, acute, from nearly glabrous to cinereous-pubescent; glands scattered, black; peduncles 4–30 cm. or more long, glandular; spikes cylindrical; bracts 5 mm. long, ovate, cuspidate, scarious, soon deciduous; calyx densely villous with silky white hairs, the lower lobe attenuate and longer than the upper one; pod 8 mm. long, obliquely ovate, acute, pubescent, with a weak recurved beak; seed 4–5 mm. long, elliptical, black.

California—San Diego Co., San Filipe Cañon, Palmer, No. 63; San Bernardino, G. W. Wright, No. 162; Brewer, No. 679; Yosemite Valley, Torrey, No. 111 bis. (1865); Indian Springs, Nevada Co., G. W. Wright (1875); Douglas (with very pubescent, almost tomentose leaflets); Ray Cañon, near Shasta, Brewer, No. 1322 (leaflets varying from glabrous or cinereous to nearly tomentose); Ojai Ch. Creek, Rothrock, No. 172 (1875); Sacramento River, Wilkes, Nos. 1297 and 1632 (labelled var. *rhombifolia*); Frémont (1843–47); Parry and Lemmon, No. 84 (1876); Palmer No. 69 (1875); San Filipe, Southern San Diego Co., Palmer No. 63 (1875); San Luis Rey, Parry, (1850); Colorado Desert, Orcutt, (1889); W. R. Prince (1854); Thomas Bridges, No. 74.

Lower California—Santo Thomas, Orcutt (1885); All Saints Bay, Miss F. E. Fish (1882); San Bernardino, S. B. and W. F. Parish, No. 1075 (1881); Wislizenus (1851).

35. PSORALEA ORBICULARIS Lindley.

Psoralea orbicularis Lindley, Bot. Reg. 23: t. 1971 (1837).

Stem prostrate, creeping, the leaves and racemes erect, glandular throughout; stipules ovate, inconspicuous; leaves 3-foliolate; petioles 2–5 dm. long; leaflets 3–8 cm. long, 3–7 cm. wide, the terminal one nearly orbicular, the lateral ones obovate and obtuse, glabrous and reticulate or pubescent, entire or rarely with broad undulate lobes; peduncles mostly exceeding the leaves; flowers in dense, hirsute spikes, 5–30 cm. long; bracts 1–1½ cm. broad, oblong-lanceolate, scarious, ciliate; calyx-lobes lanceolate, attenuate, the lower lobe often 2 cm. long; pod about 8 mm. long, somewhat inflated, hirsute, with a very small straight beak; seed elliptical, light brown.

California—Wallace (1858); Douglas; Pratten; Bolinas Bay, Kellogg (1866), labelled "*P. rotundifolia*;" Yosemite Valley and mountains, Torrey, No. 112 bis (1865); Brewer; Sprague's Ranch, Yosemite, Lemmon; Indian Spring, Nevada Co., G. W. Wright (1875); Upper Sacramento, Wilkes (1838–42); Sonoma Co., E. Samuels; Vasey (1875); Cuiamaca Mts., southern part of San Diego Co., Palmer, No. 64 (1875); Monterey, Major Rich; Southern Upper California, A. Fitch; Mr. Shelton; "Near American Fork," Frémont, No. 496 (1846); San Bernardino Valley, S. B. and W. F. Parish (1887).

PSORALEA MULTIJUGA Ell. Bot. S. C. and Ga. 2: 198 (1824).

The type specimen of this species preserved in Elliott's herbarium at the College of Charleston, Charleston, S. C., was examined by Dr. Britton and Mr. Small in January, 1894, and proved to be *Astragalus glaber* Michx.

Additional Mexican species of which I have not seen specimens and to which I have not been able to see the descriptions or find satisfactory reference.

PSORALEA HUMILIS Mill. Gard. Dict. (Ed. 8), No. 7—Mexico.

PSORALEA SPINESCENS Benth.—Mexico. (No other citation in manuscript of Kew Index.)

SOUTH AMERICAN SPECIES.

PSORALEA AZUREA R. Philippi, Fl. Ataca. 14: (1860). Chili.

PSORALEA BRACHYSTACHYA. Spruce, No. 5145 (1857-9). Andes of Ecuador, name apparently unpublished.

PSORALEA DIVARICATA H. and B.; Willd. Enum. 788 (1809). Peru.

PSORALEA HIGUERILLA Gillies; Hook. and Arn., in Hooker, Bot. Misc. 3: 181 (1838). Argentine Republic.

PSORALEA LASIOSTACHYS Vogel, Nov. Act. Acad. Cur. 19: Suppl. 1: 13 (1843). Peru, and probably also Bolivia.

PSORALEA MARGINATA Meyen, Reise, 1: 436. Peru.

PSORALEA MEXICANA (L.)

Indigofera Mexicana Linn., Suppl. 335 (1781).

Psoralea Mutisii Kunth, Plant. Legum. 1: 91, t. 54 (1819-24), fide H. B. K. 6: 487 (1823). New Grenada.

PSORALEA PUBESCENS Pers. Syn. Pl. 2: 347 (1807). Peru and Ecuador.

PSORALEA TRIANÆ n. sp.

Shrubby, slender, stems tomentose; stipules 6 mm. long, lanceolate, tomentose in the exterior; leaves 3-foliolate; petioles mostly shorter than the leaflets; leaflets 3-5 cm. or more long, lanceolate-oblong, acuminate, glandular, nearly glabrous above, tomentose beneath; flowers in interrupted cylindrical spikes exceeding the leaves; bracts 5 mm. long, ovate, densely covered on the outer surface with dark hairs, as well as the calyx; calyx 3-5 mm. long, the lobes acute; pod not seen.

New Grenada—Near Pasto, alt. 2,500 m., J. Triana (1851-1857).

PSORALEA WEDDELLIANA Baillon, Adansonia, 9: 292 (1868-70) Brazil.

This study was begun at the suggestion of Dr. N. L. Britton, and I am indebted to him for his help and much valuable advice.

The Herbaria examined have been those of Columbia College, Harvard College, the Academy of Science of Philadelphia, the State Herbarium at Washington, and that of the Shaw Botanic Garden; and I am under obligation to Dr. Robinson, Mr. Redfield, Mr. Coville and Prof. Trelease for their courtesy in allowing me the use of the collections in their charge.

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